

No. 606,672.

Patented July 5, 1898.

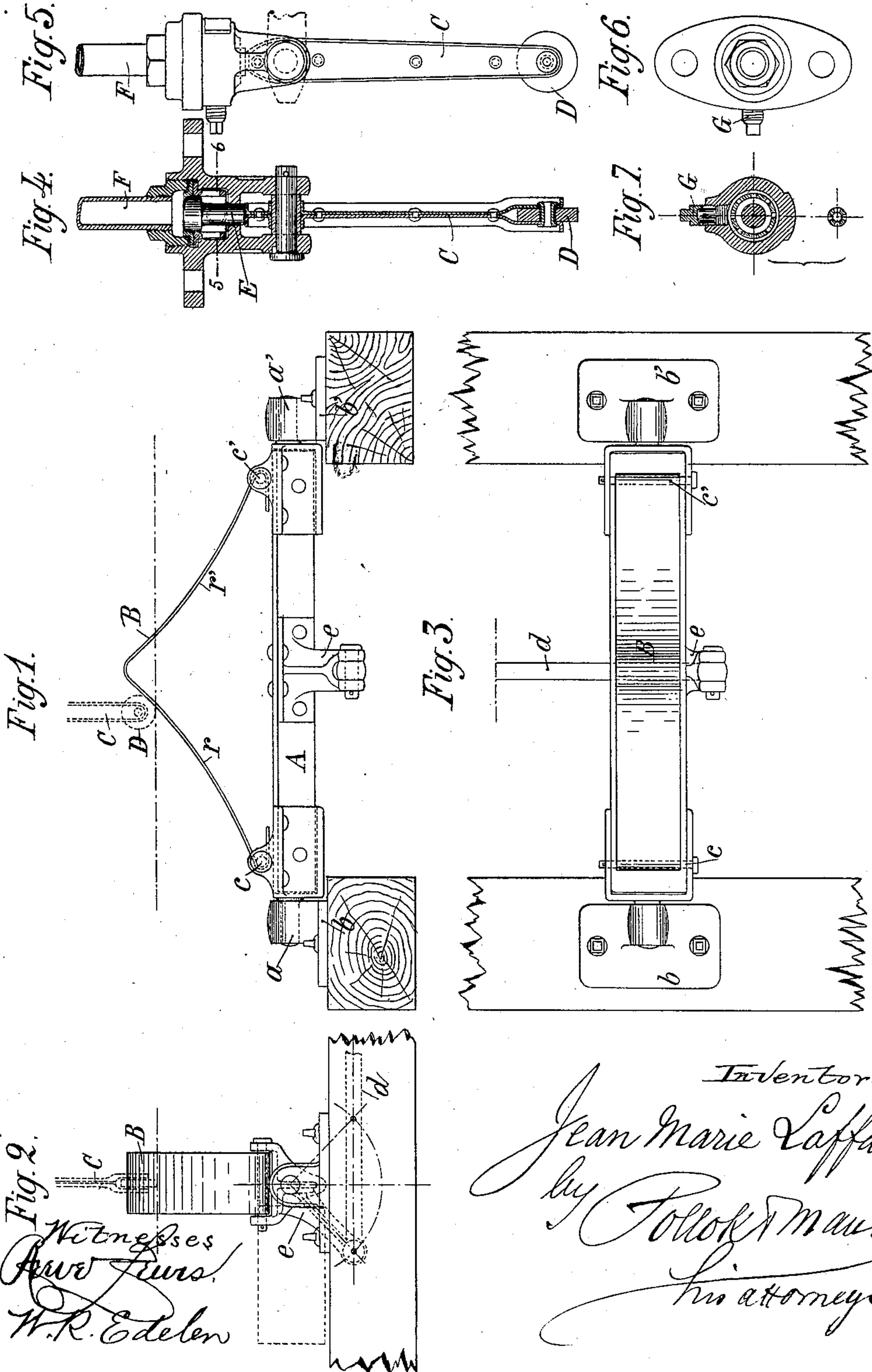
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SAFETY APPARATUS FOR RAILWAY LINES.

(Application filed Dec. 28, 1897.)

(No Model.)

5 Sheets—Sheet 1.



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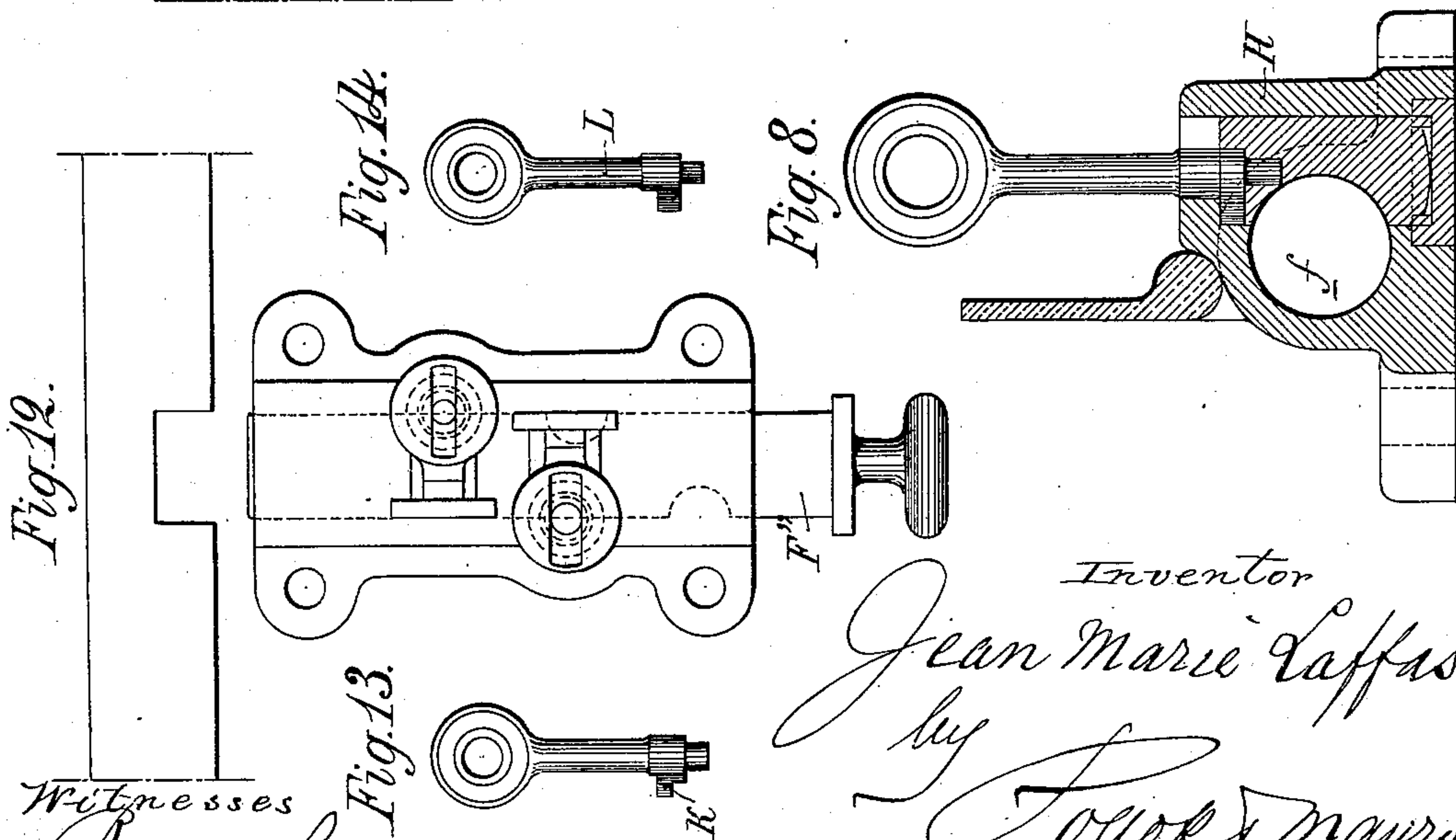
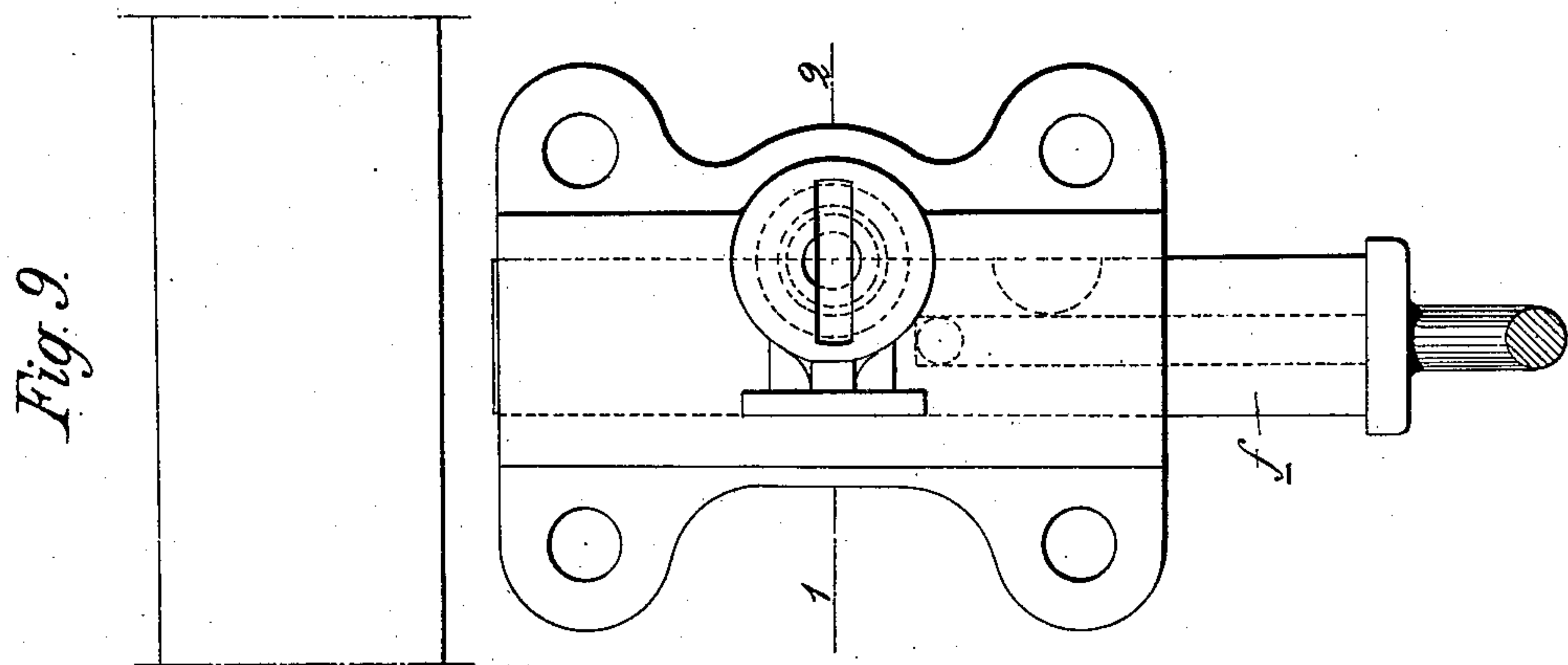
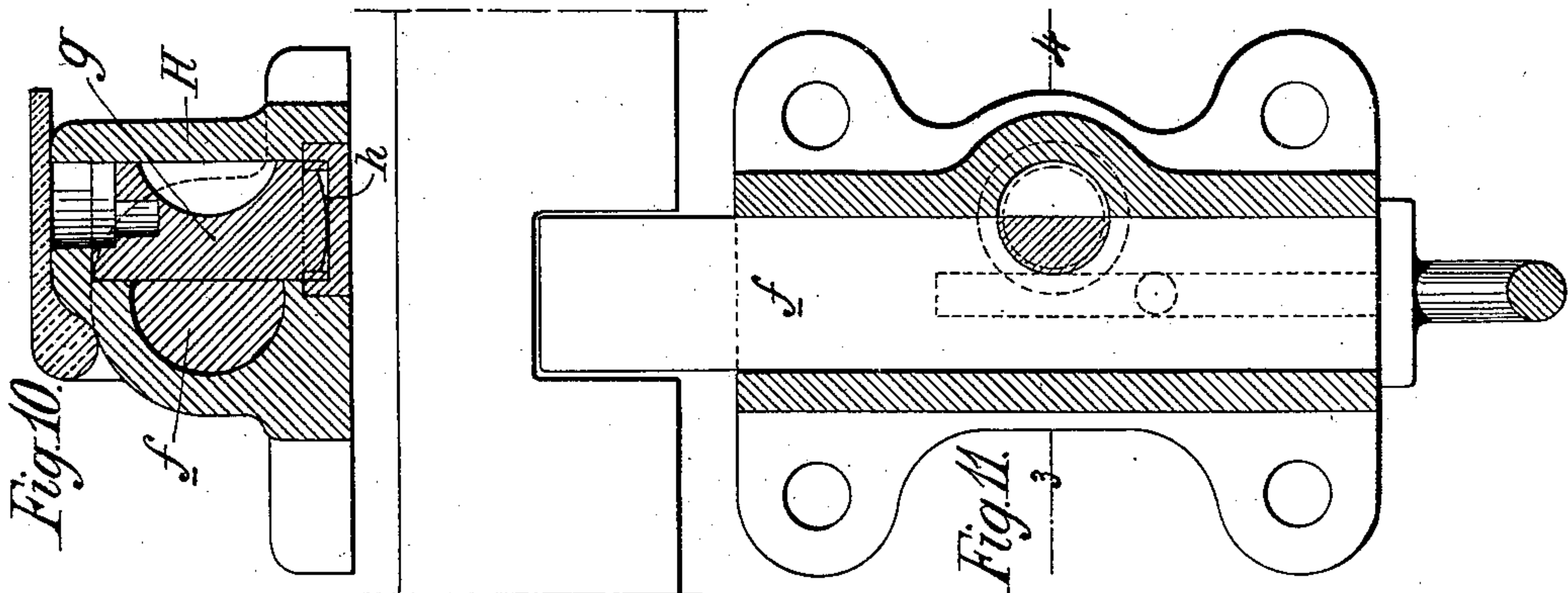
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Witnesses

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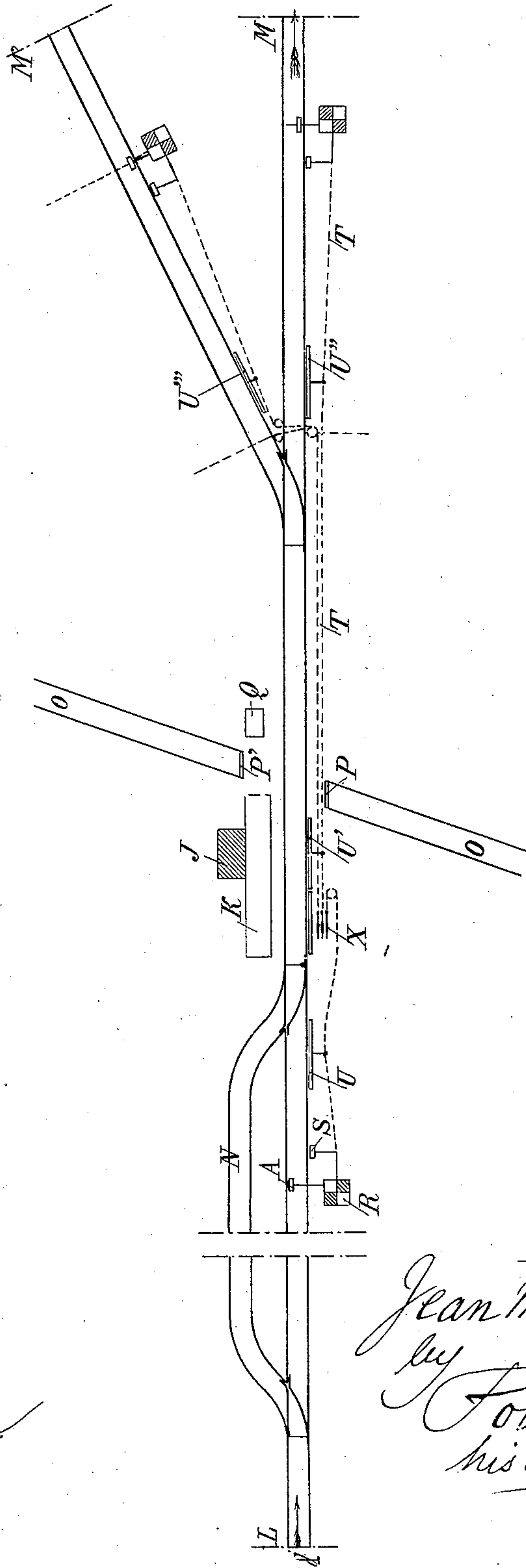
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5 Sheets—Sheet 3.

Fig. 15.



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Fig. 18.

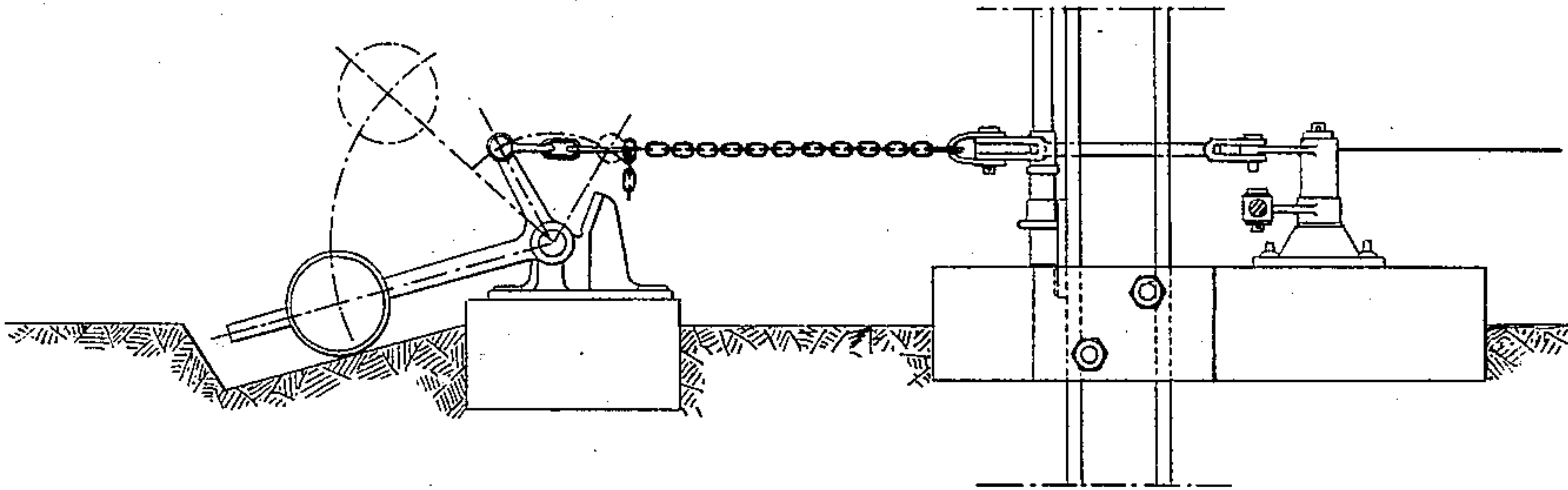
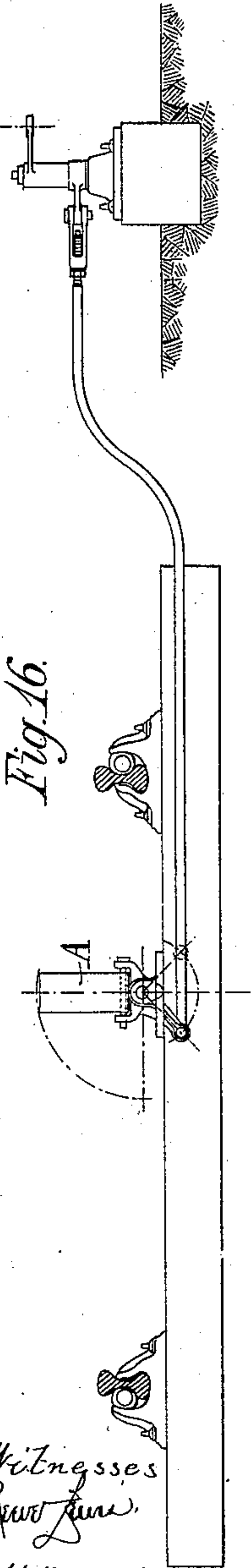
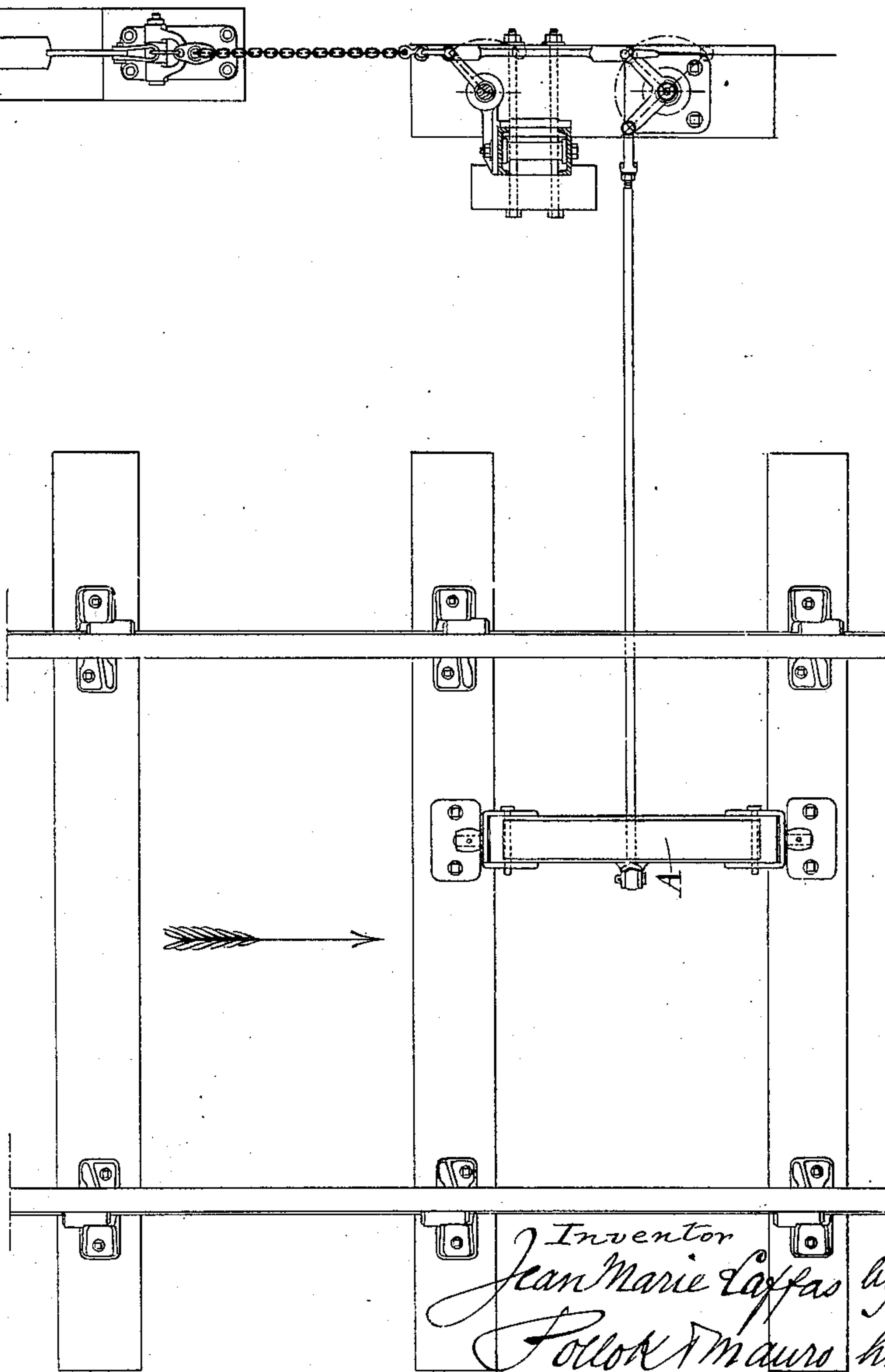


Fig. 16.



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Fig. 17.



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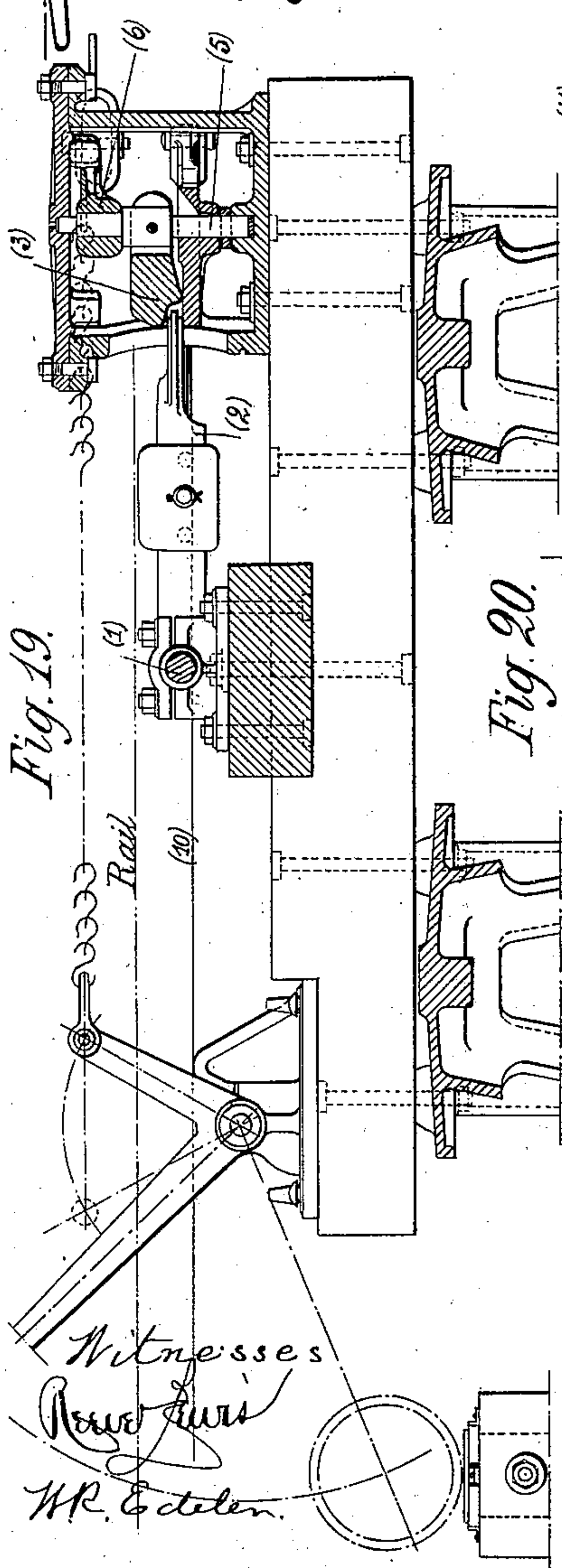
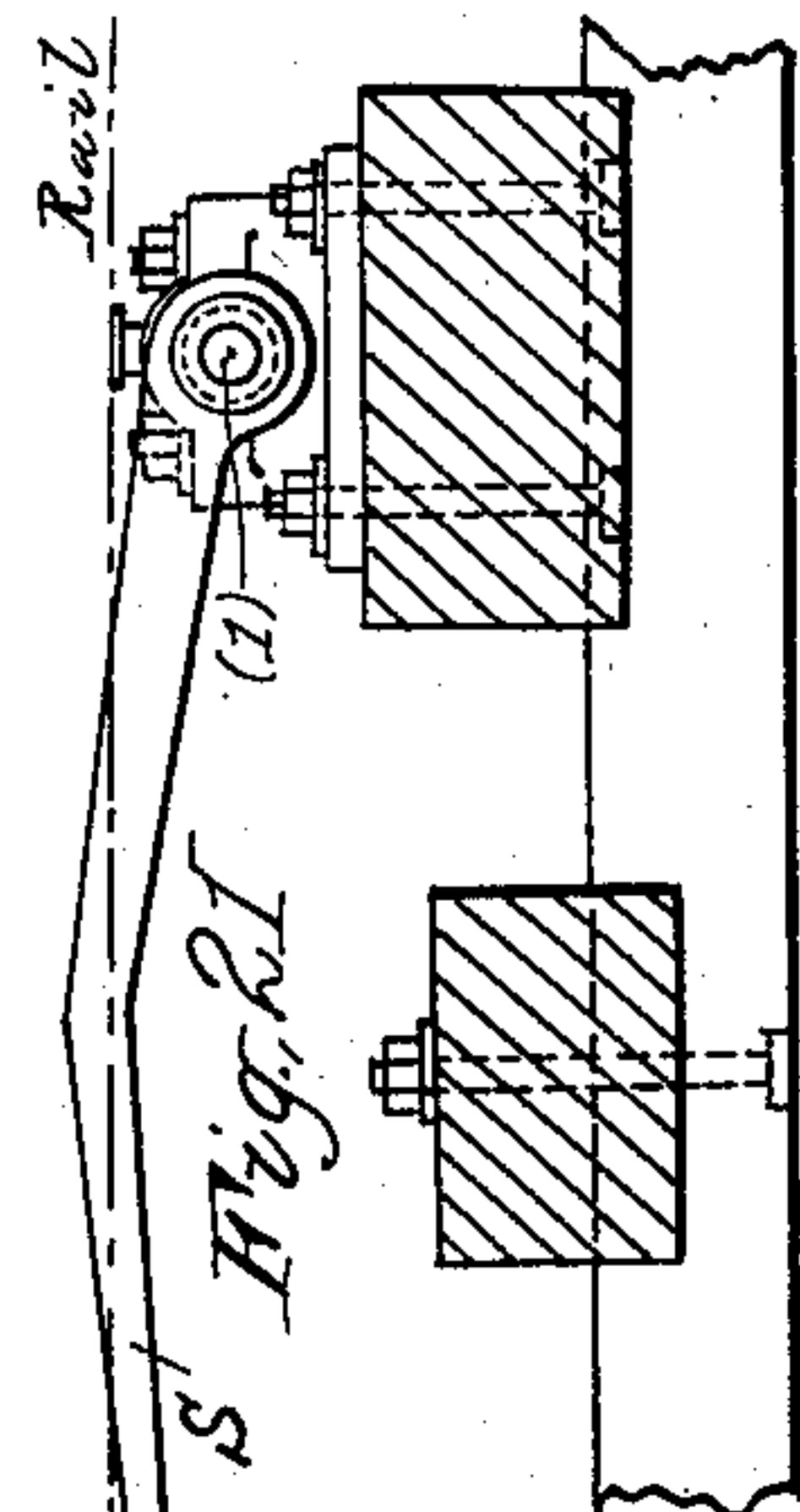


Fig. 22.

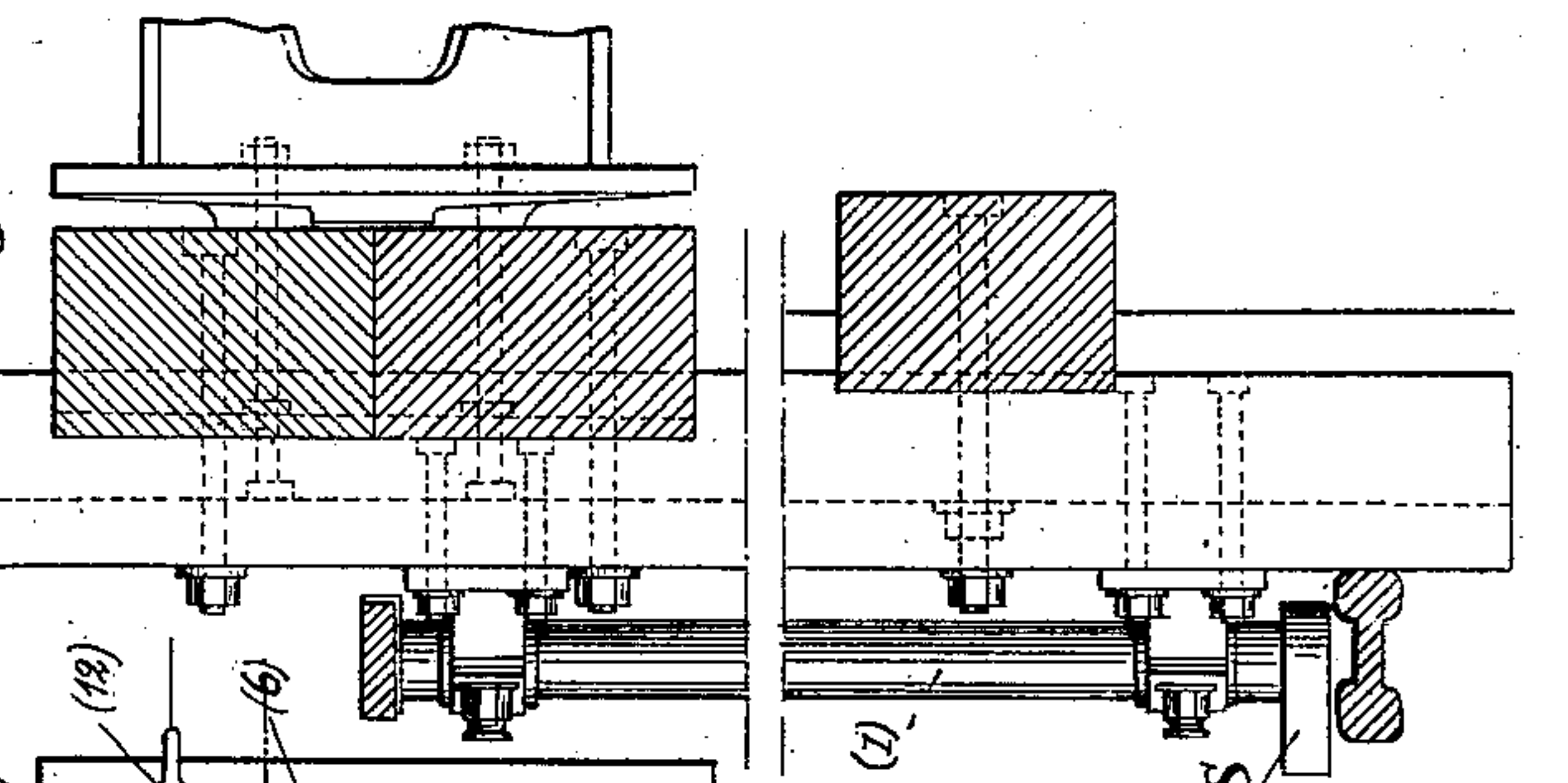
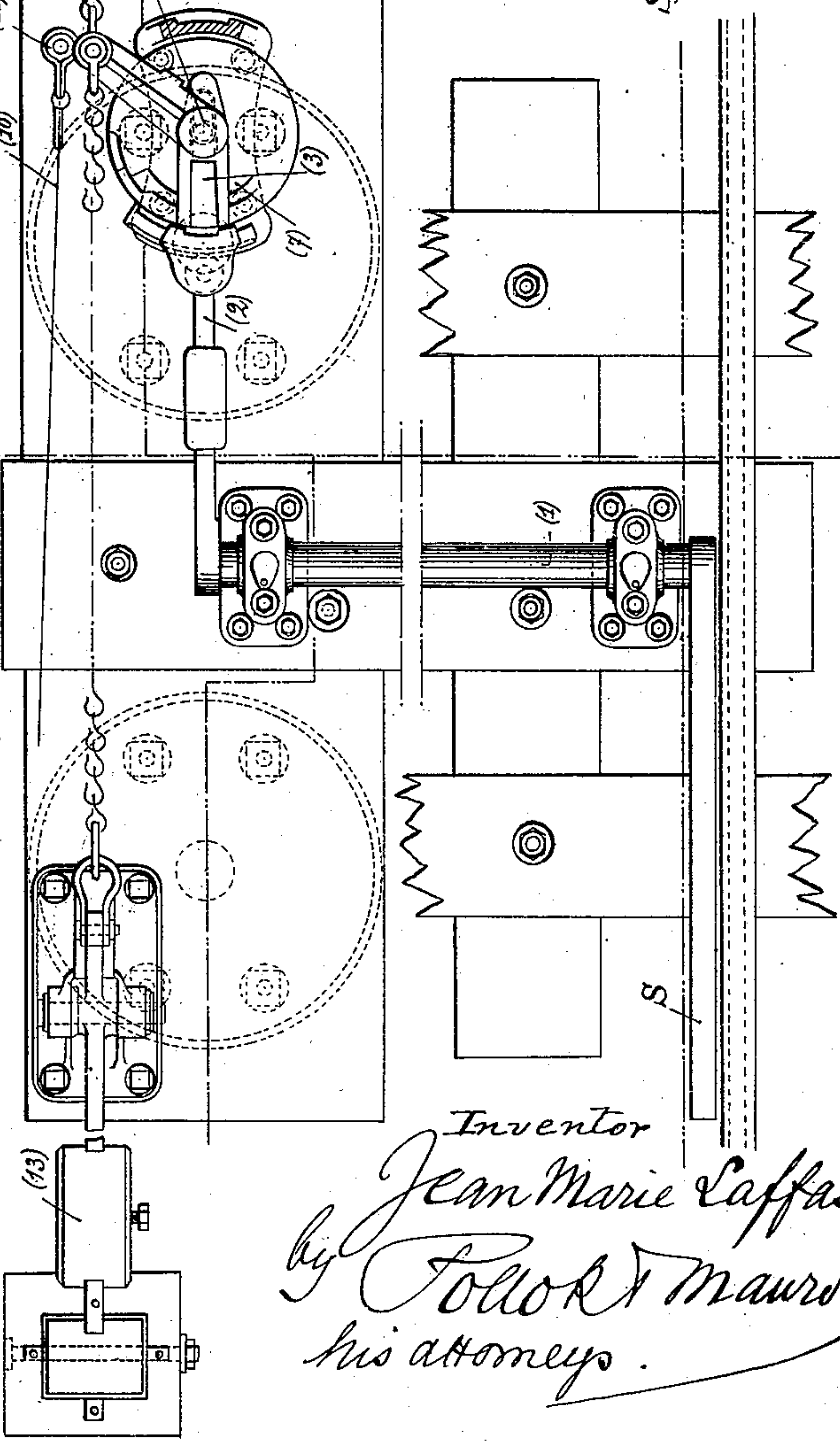


Fig. 20.



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UNITED STATES PATENT OFFICE.

JEAN MARIE LAFFAS, OF PARIS, FRANCE.

SAFETY APPARATUS FOR RAILWAY-LINES.

SPECIFICATION forming part of Letters Patent No. 606,672, dated July 5, 1898.

Application filed December 28, 1897. Serial No. 664,031. (No model.) Patented in France October 27, 1891, No. 219,024, and September 12, 1896, No. 256,654; in Belgium April 2, 1892, No. 99,080; in Germany May 31, 1892, No. 67,119; in Spain June 25, 1894, No. 15,990; in Switzerland July 23, 1894, No. 8,944; in Luxemburg July 23, 1894, No. 2,075; in Tunis July 26, 1894, No. 116; in Sweden August 1, 1894, No. 7,410; in Italy August 3, 1894, LXXII, 342; in Portugal August 8, 1894, No. 1,927; in Austria August 9, 1894, No. 44/5,429, and in Norway August 13, 1894, No. 3,909.

To all whom it may concern:

Be it known that I, JEAN MARIE LAFFAS, engineer, of 49 Rue de Londres, Paris, in the Republic of France, have invented new and useful Improvements in Safety Apparatus for Railway-Lines, which are fully set forth in the following specification, and for which I have obtained the following patents: in France, No. 256,654, dated September 12, 1896, and No. 219,024, dated October 27, 1891; in Spain, No. 15,990, dated June 25, 1894; in Germany, No. 67,119, dated May 31, 1892; in Belgium, No. 99,080, dated April 2, 1892; in Italy, No. 72/342, dated August 3, 1894; in Switzerland, No. 8,944, dated July 23, 1894; in Austria, No. 44/5,429, dated August 9, 1894; in Portugal, No. 1,927, dated August 8, 1894; in Norway, No. 3,909, dated August 13, 1894; in Tunis, No. 116, dated July 26, 1894; in Luxemburg, No. 2,075, dated July 23, 1894, and in Sweden, No. 7,410, dated August 1, 1894.

This invention has reference to improvements made in apparatus designed to increase the safety in the running of trains or vehicles on railway-lines of single or several tracks.

It consists, first, in a stop-block arranged at a suitable point in the track and which may be lowered or raised by means of a system of transmission of movement either direct or combined with the transmission of movement to the signal and its pedal, or combined with these systems of transmission and actuating counter-rail bars to be hereinafter mentioned; secondly, in a hanging lever of novel shape and arrangement designed, after it has come into contact with the block, to effect the escape of a certain quantity of air from the general conduit of the brakes and to cause these brakes to act on the wheels; thirdly, in the application and in the combination among themselves and with the other working parts—viz., the stop-block, signal with pedal, and counter-rail bars when level crossings exist close to the stations, points, or stopping-places, or any obstacle may arrive or exist on the line, or there may be a turn-bridge—of special bolts with keys, of which mention will be hereinafter made, controlling

the opening and closing of the said barriers, whether they be sliding or swinging, at the same time that the manipulating-lever, by means of which is actuated the transmission system of the ordinary signal, the stop-block, or, more generally, of the stop-block and of the counter-rail bars when these parts are connected together by the same general transmission system operated by the manipulating-lever or by the automatic pedal of the signal.

The entirety of the various means constituting the invention consists of the parts fixed on the track and of others which are fixed to the rolling-stock.

On the track at a point sufficiently in front of the station, point, or stopping-place at about two hundred and fifty or three hundred meters is fixed the stop-block; also on the track, but near the station, point, or stopping-place, is also fixed the manipulating-lever. Again, on the track, but only when there exists near the station, point, or stopping-place a level crossing or a turn-bridge, is arranged the system of safety-bolts with keys, above mentioned, regulating and consolidating in a manner suitably prearranged the opening and closing of the parts of the turn-bridge or those of the level-crossing barriers, whether these barriers be sliding or swinging, the manipulating-lever of the signal, of the block, and of the bars in such manner that the section of track in advance by two hundred and fifty or three hundred meters of the level crossing is guarded from access by any train when the crossing-barriers are or may be open or when one only of these barriers is or may be open.

On the locomotive or on one of the carriages of the train provided with brakes generally actuated by compressed air a special hanging lever is arranged and fixed in such manner and at such a point that if access to the track is forbidden by the raising of the block the lower end of this lever, provided with a roller made of an elastic material, meets the slope, also elastic and of special shape, of the said block, swings about its rotating axis, and permits, by liberating a piston acting as a plug, an escape of air from the general brake-

conduit, thus effecting a stoppage of the train by the grip exerted by the brakes on the periphery of the wheels.

Figures 1 to 22 show of what my improvements consist. Fig. 1 is a side elevation showing the stop-block raised. Fig. 2 is an end elevation, and Fig. 3 a plan, thereof. Fig. 4 is a vertical section through the axis of the movable oscillating hanging lever fixed to the locomotive or to a carriage of the train and arranged in such manner that when the train is running the lower part of this lever, provided with a roller of elastic material, can strike the slope of the stop-block when this block is raised. Fig. 5 is a side elevation thereof; Fig. 6, a plan, and Fig. 7 a transverse section through the line 5 6 of Fig. 4. Fig. 8 is a transverse vertical section through the line 1 2 of Fig. 9 of a safety barrier-bolt with key free in its setting; and Fig. 9 is a plan thereof, showing from the side and also free a sliding barrier-bar of a level crossing. Fig. 10 is a vertical transverse section through the line 3 4 of Fig. 11 of the same bolt shown in Figs. 8 and 9, but engaged in the barrier-bar and fixed in its seating by the block, which is sufficiently rotated and has become engaged in the corresponding indentation in the bolt. Fig. 12 is a plan of a safety-bolt for controlling and operating the manipulating-lever of the signal and of the block and bolt, the safety-bolt being provided with two indentations, each corresponding to a block and a key and necessitating, in order that both the two blocks may be manipulated, the use of the two keys of the bolts of the two barriers of the crossing. Figs. 13 and 14 are the two keys in question, differing from each other in the shape of the key-bits or otherwise in such manner that the key of one bolt cannot be used to manipulate the other bolt. Fig. 15 is a diagrammatic view in plan of a general installation in a case when it is necessary to protect the platform K of a stopping-place J, having a level crossing and a track following three directions with respect to the stopping-place. Figs. 16, 17, and 18 represent transmission-lines of the block, connected to the signal and to the general system of transmission, to which is also connected the transmission movement to the pedal and to the counter-rails. Figs. 19, 20, 21, and 22 refer to the arrangement and operation of the pedal, which is connected to the signal in the usual manner.

Figs. 1, 2, and 3 show the novel arrangement of the stop-block A, the body of which is now formed of a shaped piece of iron connecting the two trunnion-pieces $a a'$, which trunnions rotate in the bearings $b b'$. A flexible plate B, bent as shown in Fig. 1, is held by the two pin-bolts $c c'$, passing through the ears of the trunnions $a a'$, the turned-back ends of the sloping surfaces $r r'$ of the plate B being simply hooked onto the bolts $c c'$. The slope thus formed is elastic and contrib-

utes by this elasticity to deaden the shock. A connecting-link d , acting on the crank e , serves either to put the stop-block out of action by lowering it or to raise it again, according to the direction of the movement given to the transmission-rod d , which may be manipulated directly by a lever when the block is manipulated directly or may be connected to the transmission-rods, by means of which are actuated the ordinary indicator-signals with automatic pedals and the counter-rail bars.

Figs. 4, 5, 6, and 7 show the arrangement of the hanging lever C. It will be seen that this lever is very light, and to resist the shock without undergoing any change of shape it is constructed of two thin forged-steel plates riveted one to the other. It is provided at its lower part with a roller D, of rubber, which contributes to deaden the sudden shock against the block. The lever C in rising by rotation liberates the piston E, which under the influence of the pressure of the air contained in the general conduit F descends and opens a passage to the compressed air, which escapes into the atmosphere through the orifices made through the length of the regulating-screw G and produces in the general conduit F a depression from which results the clamping of the brakes.

Figs. 8, 9, 10, and 11 refer, as already stated, to the bolts, with keys serving to fix or to liberate each of the two gates of the level crossing. The bolts H of each barrier are alike except in so far as concerns the key, which is arranged for each of these bolts in such manner that the key of the barrier of one bolt cannot be used for the bolt of the other barrier. The entirety of each bolt consists of a draw-latch f , a rotating blocking-plate g , held at the base by a spring-ring h , acting as a brake, and a key i . The latch f engages in a corresponding opening in a part I, belonging to one gate of a level crossing or to a part of a turn-bridge. In the case of a bolt with two blocking-plates and two keys controlling the manipulating-lever the draw-latch f'' has two indentations and can engage in an opening made in the lever itself or in any point of the general system of transmission. In the position shown by Figs. 8 and 9, corresponding to an open barrier, the latch of the bolt is free, but the key is imprisoned and cannot be withdrawn for use elsewhere. In the contrary case, as in Figs. 10 and 11, the latch of the bolt is engaged in the bar of the barrier, which is then closed, and the key, being free, can be disengaged to be used elsewhere. The two barriers being thus closed, the liberation of the manipulating-lever may be proceeded with, which lever acts through the transmission system on the various parts mentioned and which is manipulated in order to lower the block, act on the signal and on its pedal and also on the counter-rail bars, unless these are under the wheels of a train or a vehicle,

in which case the said lever cannot be actuated nor the block nor any of the other working parts.

Fig. 12 shows the latch *f* of the bolt of the manipulating-lever, which latch has two indentations and two plates, and which, as has been mentioned, can only be liberated by the freedom and use of the two keys *k l*, Figs. 12 to 14, of the barrier-bolts. The barriers of the level crossing being closed and the manipulating-lever being freed, this lever cannot act on the block to lower it if, as has been mentioned, a vehicle or a train is on the counter-rail bars, which prevents these bars, which are always lowered and which have only to oscillate, from passing from one depressed position to the other—that is to say, from right to left or vice versa—to act on the block and on the signal and lower them. It is necessary, therefore, to also act on the counter-rail bars, and for this it is necessary that the train or the vehicle be started. The access of a train can then be permitted without danger and the block is lowered and also the signal.

The pedal apparatus *S*, combined with the signal, Figs. 19, 20, 21, and 22, is well known. The following is the manner of its operation in conjunction with the signal, the block, and the counter-rail bars.

When the pedal *S*, mounted on the end of the spindle 1, yields to the action of the first wheel of the train, the counterweight-bar 2 lifts the catch 3 above the notch made in the rib 7, in which it is engaged. As soon as the catch 3, which forms part of the spindle 5, lever 6, and pin 8, which passes through the spindle 5, is raised, the lever 11, loose on the spindle 5, is liberated and is drawn by the counterweight of the signal through the wire 10, and the said signal is brought to indicate "line closed," while by the same movement the stop-block is raised and the counter-rail bars are displaced. As soon as the train, after having acted on the pedal and having stopped a moment, has started again, then by acting on the manipulating-lever the wire 12 is allowed to run, this being connected by a chain to the weight-lever 13 until the catch 3 is above the notch made in the center of the rib 7 of the lever-plate 11, and this rib, which had passed underneath and held this catch and the end of the weighted lever 12 raised, passes from underneath. Then the catch 3 and the end of the weighted lever 12 fall into the notch in the lever-plate 11, the pedal *S* returns to its raised position, the signal is brought to its position of "line clear," the block is lowered, and the counter-rail bars return to their normal positions.

The diagrammatic Fig. 15 shows a general installation in plan and enables the operation of the various parts to be clearly understood. *J* is the shelter of the stopping-place, *K* the platform, from *K* to *M* the principal direction of the line, from *K* to *M'* the direction of a branch, and from *K* to *L* the third direction.

N is a siding, and *O* a level crossing, of which *P P'* are the two gates, *Q* being the signal-box. *R* is the ordinary signal placed two hundred and fifty to three hundred meters from the platform and connected by levers and links (see Figs. 16, 17, and 18) at the same time as to the ordinary pedal *S*, (see Figs. 19, 20, 21, and 22,) which automatically closes the signals by the passing of the trains to the stop-blocks *u*. Each general transmission *T T T*, which acts on the signal and the block, is also connected to the gearing of each of the counter-rail bars *U U' U''*. The transmission, when not actuated by the pedal of the signal, is actuated by the manipulating-lever *X*.

It will be seen that there should be and is a signal and a block with counter-rail bars on each side of the platform and in front thereof in each direction of the line.

If a train comes on the line at *L*, following the direction of the arrow *j*, and if the road is free and the barriers *P P'* closed, the block *A* will then be depressed and the signal *R* also, and it will indicate that the line is clear. The train can thus pass on the line freely and with safety. As soon as this has passed, however, the pedal, such as *S*, rises automatically, puts the signal into the position of "line blocked," and raises the block *A*. Then as long as the train remains standing in front of the platform or near the platform, the wheels of certain vehicles being on the counter-rail bars, it is impossible to change the position of the two working parts, the one, the indicator *R*, and the other, the protector *A*, because the wheels of the carriages prevent the counter-rail bars *U U'* from being displaced, and consequently they prevent any movement being imparted by the manipulating-lever to the general system of transmission *T*. As soon as the train has started and has passed all the counter-rail bars and if the barriers *P P'* are closed the bolt can then be disengaged, which blocks the manipulating-lever, the lever liberated and used from the platform (or any other suitable point) to actuate the signal *R* and the block *A*, so that the line may be open and accessible to another train.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a safety system for railways, an abutment or block of elastic material pivoted to the track, a lever controlling vents in the train-pipe of an air-brake system and suspended from a passing train, and means whereby said block or abutment may be operated from a distance and raised into the path of said suspended lever or depressed below the same as may be desired, substantially as described.

2. In a safety system for railways, an abutment or block of elastic material pivoted to the track, a shock-absorbing lever suspended from a passing train and controlling vents in

the train-pipe of an air-brake system, and means for turning said abutment or block into or out of the path of said lever, substantially as described.

5 3. In a safety railway system an abutment or block pivoted to the track and capable of being raised into position to set the air-brake of a passing train, a signal-operating lever at-
10 a passing train, and connections between said signal-lever and the brake-operating block or abutment, whereby the safety-brake block will be raised and the danger-signal set, each
15 substantially as described.

4. In a safety railway system, an abutment or block pivoted to the track and capable of being raised into position to set the air-brakes
20 of a passing train, a signal-operating lever attached to the track in the path of the wheels of a passing train, connections between said signal-lever and the brake-operating block or abutment, whereby the safety-brake block
25 will be raised and the danger-signal set, each automatically, by a passing train, and locking means therefor under the control of the passing train while in the protected area, sub-
stantially as described.

5. In a safety railway system, a block on the
30 track capable of adjustment to operate the

air-brakes of a passing train, a signal system in proximity to the track and operated by a passing train to set the signal to "danger," connections between the brake-operating 35 block and the signal system, whereby the operation of the latter by a passing train throws the brake-operating block into position to set the brakes of a succeeding train, a restoring-lever, and connections between the same and the signal system and brake-setting block, 40 whereby each may be restored to its normal or "clear-track" position, a gate protecting a crossing of the track, a lock for said gate, a lock for the restoring-lever, a single key for both locks, said key being irremovably en- 45 gaged in the gate-lock except when the gate is closed, and its lock thrown, whereby the restoring-lever can only be unlocked and thrown to restore the signal system and the brake-operating block to normal or clear-track 50 position when the gate is closed and locked, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JEAN MARIE LAFFAS.

Witnesses:

EDWARD P. MACLEAN,
EDWARD BEUGUIOT.